Prominent as the object is thus likely to become, it deserves a good name. I would suggest that of Pluto, and desire to urge the claims of this gentleman to the distinction. He is the only one, of the six children of Saturn whom that unnatural father was unsuccessful in eating or otherwise destroying, who has not yet stood as godfather or godmother to some member of our planetary system. The other five, Jupiter, Neptune, Ceres, Vesta and Juno, have been worthily assigned, either to major planets or to the earlier discovered members of the Mars-Jupiter belt of asteroids. For the use of the later discoveries in this numerous group the list of available female goddesses has long since been exhausted, and now sweethearts, wives, girl-babies, and even provinces, cities and towns, are jumbled together in our lists of these objects in a ludicrous way. Will it not assist to a slight return to dignity and sanity of nomenclature to give some of the neglected male gods a chance, and destroy the unfair monopoly of the *beau sexe* in such matters? This seems a good time to begin. The body in question stands apart from the Mars-Jupiter belt, practically a stunted twin of Mars himself. Moreover, there is a certain fitness in the appellation arising from its faintness or invisibility on ordinary occasions. Pluto, under his older name, Hades, was the 'invisible' or 'unknown,' the God of Darkness. This invisibility he removes, with the helmet forged for his concealment by Vulcan, when he comes to perihelion opposition, shining then as a comparatively bright star, perhaps visible to the naked eye. This helmet, by the way, could serve as his conventional planetary symbol, if one is desired.

The addition of new asteroids to our lists has become such a nuisance that ordinarily the attachment of ridiculous names may be regarded as one of the helpful influences in discouraging further useless multiplication of these troublesome wards of astronomy. But when one is born into the solar system which gives promise of paying for its keep, some attention should be devoted to a proper christening. In the solution of the problems I have indicated, Pluto may be counted on to pay handsomely for his board and clothes.

It is hoped that the discoverer will take these considerations, and others which could be urged, into account in his selection of a suitable name for this interesting and important little object.

S. C. CHANDLER.

CAMBRIDGE, October 31, 1898.

THE MINOR PLANET DQ.

THE notice in *Nature*, September 29th, quoted in SCIENCE, October 14th, seems to indicate a misunderstanding in reference to the orbit of the new minor planet DQ, by implying that it lies wholly within that of Mars. This is not the case; while the perihelion distance of the new planet is about 23,000,000 miles less than that of Mars, or only 12,500,000 miles greater than the mean distance of the earth, the eccentricity of its orbit is such that its aphelion distance is 37,300,000 miles greater than the perihelion distance of Mars, or nearly 10,800,000 miles greater than the aphelion distance of Mars. The periodic time of the new planet is only 643.7 days, or 1.76 years. The periods of all the other asteroids lie between 3.0 and 8.4 years.

The above numbers are derived from the elements of the orbit of DQ which I have computed from observations embracing an interval of 43 days. These elements confirm the results of Dr. Berberich.

W. J. HUSSEY.

LICK OBSERVATORY, October 27, 1898.

THE STRESS-STRAIN RELATIONS OF RUBBER.

IN the issue of SCIENCE of November 19, 1897, is a very interesting article by Professor Thurston upon the singular stress-strain relations of rubber, accompanied by the strain diagram for the same. This curve shows very clearly the peculiar and sudden increase in the value of the ratio of the stress to the strain as the point of rupture is approached.

It seems to the writer that this form of curve is to be expected as the result of the peculiar microscopic and physical constitution of rubber. It is well established that rubber consists of a mixture of two modifications of the same substance, one hard and fibrous and the other soft and viscous. These are identical in composition and similar in general properties and reactions. In other words, rubber consists of a

matrix of soft viscous matter with hard fibres imbedded and interlaced in all directions.

If this physical constitution of rubber is granted, it is clear that its elasticity must be due to the hard fibrous component, and that, therefore, these hard fibres are elastic.

If now the rubber be subjected to stress, the resistance at the beginning of the strain will be due to the forced change of shape of the individual elastic fibres, the bent ones being straightened and *vice versa*. As the strain becomes greater, however, the fibres are drawn out longitudinally and the applied force is less and less opposed by the resistance to change of shape of the fibres, and more and more opposed by their direct tension. In the extreme case, where the fibres are supposed straightened out lengthwise of the specimen, the resistance will be almost wholly due to the direct tensile strength of the fibres and the cohesion between them.

The action may be likened to that which occurs with a spiral spring. Thus, when the spring is first subjected to stress it opposes the applied force wholly by the resistance to change of shape of the wire, but later, when the stress becomes so great as to draw out the spiral, it acts less by its resistance to change of shape and more by virtue of its direct tensile strength. Finally, when the wire has become straight, its resistance is entirely a function of the tensile strength. Of course, in the rubber there are no fibres extending the length of the specimen, but consisting, as it does, of a network of imbedded and interlaced elastic fibres, it acts, in opposing the stress, like the spiral spring, first, by the resistance to change of shape of the fibres, and later by their cohesion and resistance to direct stress. That the action in the two cases is similar may be inferred from a comparison of the stress-strain diagram of the rubber given by Professor Thurston, with the data of the accompanying table of tests upon a spiral spring of one-fourth-inch diameter and one-inch length:

Load (lbs.).	Elongation (inches).
1	1
2	2.7
3	9.2
4	14.7
5	16.7
6	17.7
7	18.2
8	18.65
9	18 95
10	19.19
11	19.38
12	19.51

These data will plot a curve very much resembling the corresponding diagram for the rubber, and showing the same peculiar increase of the ratio of the stress to the strain.

Perhaps a better illustration of the supposed action would be given by the stress-strain relations of a chain with circular links. Here, after the links are flattened out by the stress, the applied force is opposed entirely by the direct tensile strength of the material, while in the early stages of the strain it is mainly opposed by the resistance to change of shape of the links.

It seems to the writer that some such simple explanation of the phenomena of the stress-strain relations of rubber naturally suggests itself from what is known of its physical constitution.

C. M. Broomall.

Media, Pa., October 17, 1898.

[On reference to our columns, in issues of February 19th and April 15th, our correspondent will find that Professor Fessenden some years ago (See *Jour. Frank. Inst.*, September, 1896) offered this same interpretation of the singular behavior of this peculiar substance, and has, furthermore, furnished experimental illustration of artificial reproduction of the phenomena described by Dr. Thurston. The comparison between the data for the rubber and for the helical steel spring, here given, is interesting also; but it is to be observed that the rubber finds an elastic limit only at its point of rupture, while the steel exhibits a change of law on passing an elastic limit far within that limit, usually if not always, and it certainly is not composed of such a mixture of 'hard and horn-like substance with jelly-like matter in its pores,' as is described by Fessenden. Experimental investigation must still be continued in order to reveal the secret of this curious exception to the ordinary behavior of materials of construction and of commerce.—Ed. Science.]